DOCUMENT RESUME

ED 336 076 IR 015 087

AUTHOR Knezek, Gerald A.; Miyashita, Keiko
TITLE Computer-Related Attitudes of First and Second Grade Students in the United States and Japan.
PUB DATE 91
NOTE 28p.; Paper presented at the Annual Conference of the American Educational Research Association (Chicago, IL, April 3-7, 1991).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Computer Assisted Instruction; *Cross Cultural Studies; Cultural Differences; Educational Environment; Foreign Countries; *Learning Motivation; *Microcomputers; Primary Education; Questionnaires; Statistical Analysis; *Student Attitudes; *Young Children
IDENTIFIERS *Japan; *United States

ABSTRACT

This paper reports on an exploratory cross-cultural study of the attitudes of first and second grade students toward the use of microcomputers in instruction. Questionnaire responses were compared among three groups: Japanese students in Tokyo, Japan; American students in Sanger, Texas; and Japanese students attending a special school for Japanese dependents in Dallas, Texas. Data were gathered using the Young Children's Computer Inventory (YCCI), a questionnaire developed for the study, which is intended to provide a baseline for data on attitudinal values for planned longitudinal cross-cultural research. Attitudinal differences among the three groups were explored using factor analysis, analysis of variance, and discriminant function analysis. Identifiable differences were found in the areas of Attitudes Toward Computers, Motivation To Study, and Empathy; no significant differences were found in the area of Creativity. The results indicate that cultural differences play a large part in young children's attitudes toward microcomputers. Data are presented in both tabular and narrative format, and a list of 40 item stems for the YCCI is appended. (12 references) (Author/DB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED336076

COMPUTER-RELATED ATTITUDES OF FIRST AND SECOND GRADE STUDENTS IN THE UNITED STATES AND JAPAN

by

Gerald A. Knezek, Ph.D.

Director
Educational Telecommunications and Informatics Laboratory
Texas Center for Educational Technology

Assistant Professor
Computer Education and Cognitive Systems
University of North Texas

and

Keiko Miyashita, M.Ed.

Early Childhood Education
University of North Texas

AERA CHICAGO APRIL 1991

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Gerald A. Knezek

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

1201587

BEST COPY AVAILABLE

COMPUTER-RELATED ATTITUDES OF FIRST AND SECOND GRADE STUDENTS IN THE UNITED STATES AND JAPAN

Abstract

This paper reports on an exploratory cross-cultural study of the attitudes of first and second grade students toward the use of microcomputers in instruction. Questionnaire responses were compared among three groups: Japanese students in Tokyo, Japan; American students in Sanger, Texas; and Japanese students attending a special school for Japanese dependents in Dallas, Texas. Attitudinal differences among the three groups were explored using factor analysis, analysis of variance and discriminant function analysis. Identifiable differences were found in the areas of Attitudes Toward Computers, Motivation to Study, and Empathy. No significant differences were found in the area of Creativity.

Introduction

Computers can now be found in the United States in virtually every school, at all levels of K-12 education (QED, 1989). The use of microcomputers is widely endorsed beginning as early as the first grade (Bruder, 1990). In Japan, however, the situation has been quite different. There has been very little public school utilization of microcomputers with elementary school students in Japan throughout the 1980s (Knezek, Miyashita, & Sakamoto, 1990).

National educational reform documents in Japan provide a partial rationale for Japan's contemplative approach to the introduction of microcomputers into elementary education (Ministry of Education, 1986, 1987a, 1987b). These documents have urged increased awareness of the potential "dark side" of information technology--such as possible loss of touch with reality, decreased socialization skills, and reduced creative thinking abilities--while Japan concurrently proceeds with what is being termed the "informationalization" (preparation for the information age; Sakamoto & Nishinosono, 1990) of its society.

This "informationalization" of Japanese society can be expected to rapidly accelerate with the planned massive infusion of computing technology into the Japanese educational system beginning in 1992 (Sakamoto & Nishinosono, 1990). Such a nationwide, large scale change provides an opportunity to study the good and bad effects of introducing this technology, especially by contrasting any measured changes in Japan with time-synchronized changes in a country like the United States, where the large scale introduction of instructional information technology is already well underway.

This study is intended as a first step in planned longitudinal cross-cultural research on the long term effects of information technology on society. The attitudinal values reported here are intended to serve as a baseline for data gathered in Japan and the U.S. in future years.

Method

YCCI Development

The Young Children's Computer Inventory was used to gather data for the study. This instrument was derived from a questionnaire originally developed by Dr. Takashi Sakamoto of the Tokyo Institute of Technology for use in a recent UNESCO study at the fourth grade level (Sakamoto, personal communication, 1990). Sakamoto's questionnaire consisted of 159 items on the following five subscales: Attitudes Toward Computers, Psychological Effects of Computers, Creativity, Motivation to Study, and Empathy. The subscales of Creativity and Motivation to Study were previously used in a 1985 international comparison of student study skills (Sakamoto, 1985a, 1985b).

The YCCI was produced for the target audience of first graders by removing the subscale Psychological Effects of Computers and reducing the number of items on each of the remaining four subscales to 10 and 15 items for the U.S. and Japanese versions, respectively. Several of the items retained were also reworded to make them more understandable for first graders. Finally, the number of Likert-type choice categories was reduced from the original five to the three-point scale of "No" (disagree), "I Don't Know" (Undecided), and "Yes" (agree). Only the ten items from each subscale which were used at all three sites were employed for the current research. That is, the results reported in the following sections are based

upon the 40 items listed in the Appendix.

Administration

A 40 item English-language version of the YCCI was administered to 112 first grade students at the Chisholm Trail Elementary School in the northern Texas community of Sanger during May, 1990. 52% of the students were male, and 9% were members of an ethnic minority (Hispanic or Black). All students had received two, 50-minute periods of computer laboratory instruction per week throughout the academic year. Each of six first grade teachers read the questions with their classes and aided students with brief interpretations of questions, as necessary. This procedure required 20-40 minutes per class. The completion rate was 100%.

A 60 item Japanese-language version of the YCCI was administered to 99 first and second grade students in the Todoroki Elementary School, Tokyo, Japan, during September, 1990. 56% of the students were male, and fewer than 1% were members of an ethnic minority. As was typical for Japanese public schools at this level throughout the 1980's (Knezek, Miyashita, & Sakamoto, 1990), none of the students had received hands-on computer laboratory instruction during the academic year. Children were asked to answer each item with their parents at home, then return the completed instrument to their teachers at school. This procedure required approximately 20 minutes for each student. The return rate was 100%.

Approximately one week after the Tokyo administration, the same 60 item version of the YCCI was administered to all 60 first and second grade students attending the (Saturday only) Japanese Advancement School of Dallas for dependents living abroad. (These Japanese students attend normal U.S. schools Monday-Friday, with varying amounts of exposure to computers in school.) 50% of the students were male, and approximately 3% were of mixed racial ancestry. As with the Tokyo site, students in Dallas were asked to answer each item with their parents at home, then return the completed instrument to their teacher at school. 51 of the 60 students (85%) completed and returned the questionnaire.

Data Analysis

Three methods of factor analysis (Unweighted Least Squares, Generalized Least Squares, Maximum Likelihood; Norusis, 1985) and two methods of factor rotation (Varimax, Oblimin) were performed on the combined 262-subject data set in order to confirm the existence of four subscales in the questionnaire. Next, four one-way analyses of variance were performed on the subjects' factor scores (constructed responses to hypothetical items representing each factor) to determine if students at the Tokyo, Dallas, and Sanger sites differed in their attitudes.

Factor scores (ULS, Varimax) for the three non-correlated subscales (Attitudes Toward Computers, Creativity, Empathy) were also entered into the program MacSpin (Donoho, Kerrick, & Olson,

1990) to enable manual rotation in simulated three-dimensional space.

In addition, a discriminant function analysis (Norusis, 1985) was performed on the combined 262-subject data set to determine if differences in responses on the 40 questionnaire items could successfully predict whether the respondents were American (Sanger site), Japanese living in America (Dallas site), or Japanese living in Japan (Tokyo site).

Results

General Trends in Data

Table 1 contains means and standard deviations for each of the three sites on the 40 questionnaire items. Responses were coded as 1 = disagree, 2 = undecided, and 3 = agree. In general, responses were quite high, with item averages ranging from 1.98 to 2.89 at the Sanger site, from 1.59 to 2.94 at the Dallas site, and 1.32 to 2.95 at the Tokyo site. Response averages across all items were 2.60 for Sanger, 2.46 for Dallas, and 2.35 for Tokyo. Item 23 (I feel happy to see a friend smiling; overall mean = 2.82), item 24 (I feel sad to see an animal wounded; mean = 2.86), and item 37 (I invent games and play them with friends; reflected mean = 2.86) were rated relatively high by students at all three sites. Item 5 (I would like to study from teachers rather than from computers; reflected mean = 1.78) was rated relatively low at all three sites, indicating students tend to prefer human teachers over computers.

Insert Table 1 about here

Factor Analysis

A scree plot of the factor analysis eigenvalues (plot of variance explained by each factor; Dunn-Rankin, 1983) indicated either four or five factors exist in the data. All extraction methods produced similar patterns of factor loadings among the items. Generalized Least Squares (GLS) results were selected for presentation in Table 2 because the GLS four-factor solution accounted for a greater percentage of the total variance (24.4%) than other extraction methods. As shown in Table 2, 8 of 10 Attitudes Toward Computers items, 6 of 10 Motivation to Study items, 7 of 10 Empathy items, and 10 of 10 Creativity items had their strongest loadings on the anticipated factors. An Oblimin (oblique) rotation confirmed that Motivation to Study is correlated with Attitudes Toward Computers ($r = .27$) and Creativity. ($r = .26$).

Insert Table 2 about here

Factor Score ANOVAs

As can be seen in Table 3, factor score differences were highly significant for Attitudes Toward Computers, Motivation to

Study, and Empathy. Texas students (Sanger site) were more positive than Tokyo students in their Attitudes toward Computers and in their Motivation to Study, but scored lower on Empathy than their Tokyo counterparts. No significant differences were found in the area of Creativity.

Insert Table 3 about here

Factor Score Graphical Displays

Results of exploring graphical representations of the factor analysis through the MacSpin (Donoho, Kerrick, & Olson, 1990) simulated three-dimensional display program are shown in Figure 1. The subscales of Attitudes Toward Computers, Creativity, and Empathy were used as X, Y, and Z axes for plotting subjects in three-dimensional space. A one-third (approximate) sample rate was chosen for each group to make the output more legible when printed.

The upper portion of Figure 1 shows that Tokyo and Texas students are reasonably well separated along the dimensions of 1) Attitudes Toward Computers and 3) Empathy, but not with respect to 2) Creativity. The Japanese students living in Dallas are more widely dispersed in this three-dimensional space, with several lying in the same "neighborhood" as Tokyo students, and

some quite similar to Sanger (Texas) students. Nevertheless, as shown in the lower portion of Figure 1, it is possible to graph the three-dimensional centroid of the Japanese students living in Dallas, and to see that (as a group) they lie between Tokyo students and traditional Texas students.

Insert Figure 1 about here

Discriminant Analysis

Results of the discriminant function analysis are shown in Table 4. 19 of the 40 items were selected in a stepwise procedure. A two-function solution correctly classified 91% of the Sanger students, 86% of the Tokyo students, and 42% of the Dallas students. The territorial map of these three groups in two-dimensional space is shown in Figure 2. These results are generally consistent with the MacSpin representation of Factor Scores shown in Figure 1.

Insert Table 4 about here

Insert Figure 2 about here

Discussion

The YCCI may actually contain five meaningful subscales, rather than the four proposed. An examination of the initial factor eigenvalue scree plot (showing total variance explained by each factor) led the researchers to run a five-factor solution (Generalized Least Squares, Oblimin rotation). Results indicated that the subscale Motivation to Study is actually a composite of Study Habits (items 12, 13, 14, 16, 17) and a kind of Motivation related to persistence or "drive" (items 15, 18, 19, 20). Factor score ANOVAs on these subscales showed no significant differences among the three sites in Motivation/Persistence/Drive (factor score ANOVA, p=.43), but large differences in Study Habits (p=.0000). Study Habits and Motivation/Persistence/Drive are correlated with each other (r=.16), but each is correlated even more strongly with Attitudes Toward Computers (r=.27 and .21, respectively) and Creativity (r=.17 and .21). Surprisingly, item 4 (I think computers are very easy to use) is also strongly correlated (r=.56) with good study habits.

Further analysis of individual items from significantly different subscales pinpointed additional differences between sites. The following observations are based upon one-way analysis of variance tests for individual items, using Scheffe's multiple range test with alpha set at .01:

1. Sanger students think computers are easy to use, relative to Dallas and Tokyo students (item 4, f= 42.5). Hypothesized reason: Greater use increases perception of ease of use.

2. Sanger students more strongly agree that computers provide opportunities to learn new things (item 8, f = 21.6). Hypothesized Reason: Longer exposure increases awareness of educational possibilities.
3. Sanger and Dallas-based Japanese students enjoy lessons on the computer more than Tokyo students (item 2, f= 21.4). Hypothesized reason: Students who use computers in school have greater opportunities to enjoy computer-based lessons.
4. Sanger students, compared to Tokyo students, believe they will enjoy school more if teachers use computers (item 9, f= 10.6). Hypothesized reason: Any positive educational experience can be amplified by teachers.
5. Sanger students believe more strongly than Tokyo students that it is more important to learn how to use a computer (item 6, f= 10.0). Hypothesized reason: U.S. cultural characteristic.
6. Sanger students believe more strongly than Tokyo students that they will get a good job if they learn how to use a computer (item 7, f= 5.2). Hypothesized reason: U.S. cultural characteristic.
7. Dallas-based Japanese students do not tend to review their lessons each day (item 12, f= 43.8) Hypothesized reason: Dallas students receive <u>weekly</u> Japanese instruction, rather than daily.

8. Tokyo students do not like to ask the teacher questions (item 14, f= 18.8). Hypothesized reason: Japanese cultural characteristic.
9. Sanger students study without anyone forcing them (item 17, f= 18.3). Hypothesized reason: U.S. cultural characteristic stressing individuality.
10. Sanger students try to finish whatever they begin (item 16, f= 12.7). Hypothesized reason: Sanger school stresses task completion.
11. Sanger students, more so than Tokyo students, like to work out applied problems (item 13, f= 10.5). Hypothesized reason: U.S. emphasizes problem-solving skills in education.
12. Tokyo students more strongly empathize with children lacking friends than do Sanger students (item 25, f= 9.1). Hypothesized reason: Japanese culture stresses value of friends.
13. Sanger students tend to think about alternative ways of solving a problem more so than do Tokyo students (item 34, f= 6.5). Hypothesized reason: U.S. emphasizes problem-solving skills in education.
14. Tokyo students tend to invent games to play with their friends (item 37, f= 5.4). Hypothesized reason: Japanese culture encourages group play.

15. Sanger students, more so than Tokyo students, tend to find new things to play with or study about on their own. (item 33, f= 5.6). Hypothesized reason: U.S. culture stresses individuality.

An explanation of the general trends among these items is also in order. Sanger students obtained the highest mean score for each item selected in the area of Attitudes Toward Computers. Every mean score for Dallas students fell between Sanger and Tokyo student means. Therefore, the general hypothesis for this area is that children experienced with computers have more positive attitudes toward computers than do children who have had few or no experiences with them. Moreover, children who have had some computer experiences at school have had increased opportunities to feel that computer experiences are enjoyable.

In some cases, the mean scores for Dallas students were similar to the means for Tokyo students. For example, neither Tokyo nor Dallas students felt strongly that computers were an important tool for learning or helping them to obtain solid careers in the future. This can be explained in two possible ways: (1) Because Japanese children had few or no experiences compared to Texas students, they had learned relatively few things on a computer, or (2) Because Japanese people tend to think that entering a good university is most important for getting a good job, and because knowledge of computer use is not directly related to entrance examinations, children do not feel strongly that the computer is related to their future careers.

Three subscales, Motivation to Study, Empathy, and Creativity, seem to be highly related to cultural differences, as evidenced by the fact that most of the mean scores obtained by Dallas students and Tokyo students were similar, compared to the mean scores obtained by Sanger Students. For example, Sanger students study independently and prefer problem solving tasks. On the other hand, both Dallas and Tokyo students are more often encouraged to study by others. The same situation exists in other areas, such as play. Sanger students tend to play without any help, whereas Tokyo students tend to cooperate with their friends. Both Dallas and Tokyo students value friends more strongly than Sanger students.

Results point toward the need for additional research in the area of Japanese-American attitudes related to the use of microcomputers in instructional environments. For example, one might expect Japanese-American students in Hawaii to have attitudinal values somewhere between Tokyo students and Texas students, but it is also possible that Hawaii students will have attitudes more extreme than Tokyo (farther away from Texas) because the Japanese culture now in Hawaii came from Japan several generations ago. An appropriate Hawaii site is currently being sought to enable further research in this area.

Summary

262 first and second grade students from Sanger, Texas, Tokyo, Japan and a Saturday-only Japanese school in Dallas completed the Young Children's Computer Inventory between May and September, 1990. An analysis of variance of the factor scores for this data determined Sanger students to be more positive than Tokyo students in Attitudes Toward Computers, less positive than Tokyo students in Empathy, and more positive than Tokyo students with respect to Motivation to Study. No significant differences were found in the area of Creativity. A discriminant function analysis was able to identify survey respondents, by site, with the following accuracy: 1) Sanger = 91% correct, 2) Dallas = 42% correct, and 3) Tokyo = 86% correct. Graphical and tabular representations of the data confirmed that Dallas-based Japanese students typically lie between Tokyo students and traditional Texas students on the attributes measured.

REFERENCES

Bruder, I. (1990). School interest grows as televised classroom news battles heat up. Electronic Learning, 9 (4), 10-13.

Donoho, A. W., Kerrick, D. D., & Olson, C. W. (1990). MacSpin version 3.0. Austin, TX: D-squared Software, Inc.

Dunn-Rankin, P. (1983). "Factor analysis." in Scaling methods (pp. 165-179). Hillsdale, NJ: Laurence Erlbaum Associates, Inc.

Knezek, G., Miyashita, K., & Sakamoto, T. (1990). "Computers in education: Japan versus the United States." In A. McDougall & C. Dowling (Eds.), Computers in education (pp. 775-780). Holland: Elsevier Science Publishing Company, Inc.

National Council on Educational Reform, (1986, April 23). Summary of second report on educational reform. Tokyo: Government of Japan.

National Council on Educational Reform, (1987, April 1). Third report on educational reform. Tokyo: Government of Japan.

National Council on Educational Reform, (1987 August 7). Fourth and final report on educational reform. Tokyo: Government of Japan.

Norusis, M.J. (1985) SPSS-X advanced statistics guide, Chicago: SPSS, Inc., Chapters 3 & 4.

Quality Education Data, Inc., (1989). "Microcomputer usage in schools: A 1989 QED Update." Denver: QED, Inc.

Sakamoto, T., Matsuda, T., Muta, H. (1985). "An international comparison of student study skills" in G. d'Ydewalle, (Ed.) Cognition, information processing, and motivation (pp. 727-750) North Holland: Elsevier Science Publishers Company, Inc.

Sakamoto, T. (1985). Characteristics of study skills in Japanese pupils. Evaluation in Education, 9(3), 243-251.

Sakamoto, T. & Nishinosono, H. (1990, July). "The informationalization of education in Japan." Presentation to the National Perspectives Mini-Conference of the 5th World Conference on Computers in Education. Auckland, New Zealand.

Table 1

Descriptive Statistics

Item	Sanger		Dallas		Tokyo	
	Mean	SD	Mean	SD	Mean	SD
Item 1	2.87	.39	2.51	.67	2.49	.50
Item 2	2.84	.48	2.77	.51	2.38	.58
Item 3	2.58	.66	2.59	.70	2.33	.62
Item 4	2.69	.67	2.06	.81	1.81	.65
Item 5*	1.98	.80	1.80	.87	1.56	.66
Item 6	2.73	.59	2.44	.79	2.35	.63
Item 7	2.67	.56	2.45	.67	2.38	.67
Item 8	2.80	.49	2.39	.78	2.30	.54
Item 9	2.61	.67	2.29	.83	2.13	.74
Item 10	2.82	.50	2.80	.53	2.71	.56
Item 11	2.68	.62	2.57	.76	1.62	.68
Item 12	2.31	.84	1.59	.83	2.68	.64
Item 13	2.20	.84	1.78	.86	1.32	.68
Item 14	2.79	.54	2.65	.72	1.68	.84
Item 15	2.24	.89	2.88	.38	2.15	.95
Item 16	2.81	.51	2.37	.87	2.72	.66
Item 17	2.53	.76	1.92	.91	2.36	.81
Item 18	2.40	.85	2.45	.86	1.86	.89
Item 19	2.63	.63	2.45	.78	2.49	.78
Item 20	2.64	.70	2.59	.73	2.41	.83
Item 21	2.67	.62	2.75	.63	2.88	.36
Item 22	2.86	.46	2.24	.89	1.90	.93
Item 23	2.89	.41	2.86	.45	2.72	.62
Item 24	2.76	.59	2.94	.31	2.88	.39
Item 25*	2.16	.88	2.55	.64	2.58	.67
Item 26*	2.06	.94	2.30	.91	1.79	.89
Item 27*	2.32	.88	2.45	.83	2.52	.79
Item 28	2.77	.58	2.75	.56	2.79	.44
Item 29	2.82	.48	2.59	.75	2.75	.52
Item 30	2.76	.58	2.61	.72	2.63	.63
Item 31	2.68	.59	2.77	.51	2.69	.60
Item 32	2.75	.57	2.61	.70	2.70	.58
Item 33	2.74	.60	2.55	.73	2.42	.72
Item 34	2.61	.64	2.20	.80	2.42	.66
Item 35	2.63	.67	2.57	.73	2.55	.72
Item 36	2.70	.56	2.37	.82	2.61	.67
Item 37	2.74	.63	2.88	.43	2.95	.22
Item 38	2.54	.70	2.29	.81	2.50	.75
Item 39	2.45	.75	2.29	.67	2.27	.68
Item 40	2.69	.67	2.29	.88	2.27	.81

* Scores for these negatively-worded items have been reversed.

Table 2

Factor Analysis Results

A. Final Statistics

Factor	Eigenvalue	Pct of Var	Cum Pct
1	5.30	13.2	13.2
2	1.89	4.7	18.0
3	1.40	3.5	21.5
4	1.18	3.0	24.4

B. Factor Loadings (Pattern Matrix)

	Factor 1 (Attitudes Toward Computers)	Factor 2 (Creativity)	Factor3 (Empathy)	Factor4 (Motivation To Study)
Item 8	.71			
Item 6	.62			
Item 1	.56			
Item 2	.49			
Item 9	.43			
Item 3	.39			
Item 7	.38			
Item 10	.28			
Item 39		.60		
Item 35		.52		
Item 33		.47		
Item 37		.42		
Item 31		.37		
Item 32		.36		
Item 38		.33		
Item 40		.30		
Item 36		.28		
Item 34		.24		
Item 28			.50	
Item 30			.48	
Itme 21			.43	
Item 29			.34	
Item 25			.33	
Item 24			.24	
Item 27			.17	
Item 12				.64
Item 17				.54
Itme 13				.47
Item 16				.44
Item 14				.42
Item 19				.17

Table 2 (continued)

C. Factor Correlations

	Factor 1 (Attitudes Toward Computers)	Factor 2 (Creativity)	Factor 3 (Empathy)	Factor 4 (Motivation To Study)
Factor 1 (Attitudes Toward Computers)	1.00000			
Factor 2 (Creativity	.18462	1.00000		
Factor 3 (Empathy)	.04742	.11965	1.00000	
Factor 4 (Motivation To Study)	.26783	.26486	-.01779	1.00000

Table 3

Analysis of Variance (Factor Scores)

A. Attitudes Toward Computers

Source	D.F.	Sum of Squares	Mean Squares	Ratio	Prob.
Between Groups	2	51.7544	25.8772	40.8196	.0000
Within Groups	216	136.9312	.6339		
Total	218	188.6855			

B. Creativity

Source	D.F.	Sum of Squares	Mean Squares	Ratio	Prob.
Between Groups	2	.1860	.0930	.1124	.8938
Within Groups	216	178.7360	.8275		
Total	218	178.9220			

C. Empathy

Source	D.F.	Sum of Squares	Mean Squares	Ratio	Prob.
Between Groups	2	9.3358	4.6679	6.1908	.0024
Within Groups	216	162.8644	.7540		
Total	218	172.2002			

D. Motivation To Study

Source	D.F.	Sum of Squares	Mean Squares	Ratio	Prob.
Between Groups	2	58.3302	29.1651	53.8107	.0000
Within Groups	216	117.0707	.5420		
Total	218	175.4008			

Table 4

Discriminant Analysis Results

A. Classification Results

Actual Group	No. of Cases	Predicted Group Membership 1	2	3
Sanger (1)	86	78	4	4
		90.7%	4.7%	4.7%
Dallas (2)	50	8	21	21
		16.0%	42.0%	42.0%
Tokyo (3)	95	6	7	82
		6.3%	7.4%	86.3%

B. Summary

Step	Action Entered	Removed	RAO'S V	Sig.
1	Item 12		72.01	.00
2	Item 15		141.15	.00
3	Item 4		217.27	.00
4	Item 22		273.85	.00
5	Item 1		302.77	.00
6	Item 2		325.68	.00
7	Item 25		346.45	.00
8	Item 24		362.20	.00
9	Item 36		376.97	.00
10	Item 14		396.70	.00
11	Item 16		409.06	.00
12	Item 26		419.79	.00
13	Item 37		430.01	.00
14	Item 34		440.22	.00
15	Item 5		449.68	.00
16	Item 17		457.87	.00
17	Item 18		468.44	.00
18	Item 21		473.48	.00
19	Item 29		478.05	.00

C. Canonical Discriminant Function

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Wilks' Lambda	Significance
1	1.90	85.98	0.81	0.26	0.00
2	0.31	14.02	0.49	0.76	0.00

Table 4 (continued)

D. Standardized Canonical Discriminant Function Coefficients

	Function 1	Function2
Item 1	0.20	-0.22
Item 2	0.23	0.49
Item 4	0.41	0.04
Item 5	0.14	0.05
Item 12	0.37	0.05
Item 14	0.14	0.40
Item 15	-0.54	0.39
Item 16	0.19	-0.04
Item 17	0.20	0.07
Item 18	-0.18	-0.09
Item 21	-0.10	-0.20
Item 22	0.38	0.02
Item 24	-0.16	0.10
Item 25	-0.19	0.05
Item 26	0.00	0.49
Item 29	-0.01	-0.28
Item 34	0.09	-0.30
Item 36	-0.09	-0.52
Item 37	-0.15	0.12

Figure 1
Factor Score Representations of Students at Three Survey Sites Based Upon Creativity, Empathy, and Attitudes Toward Computers.

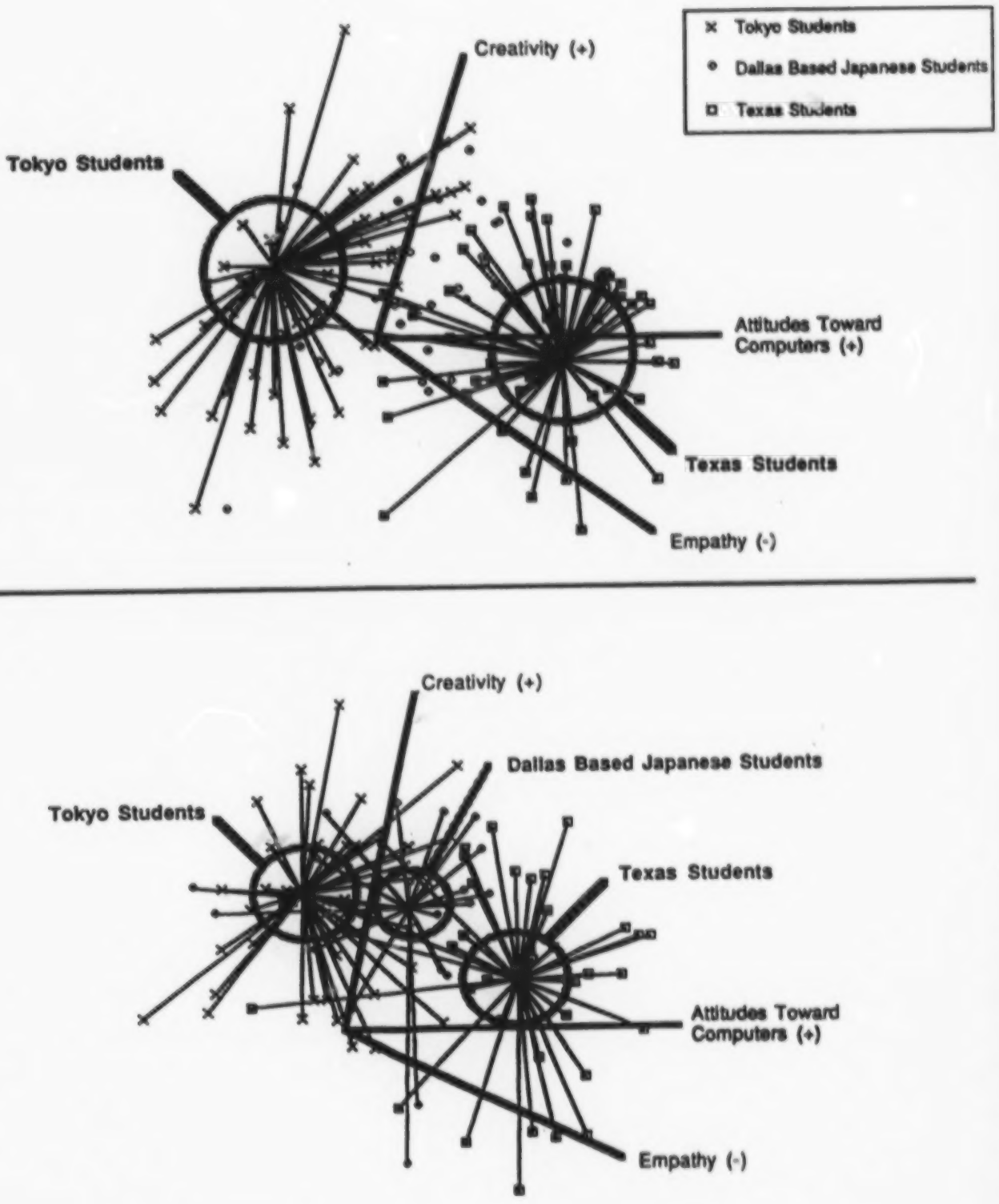
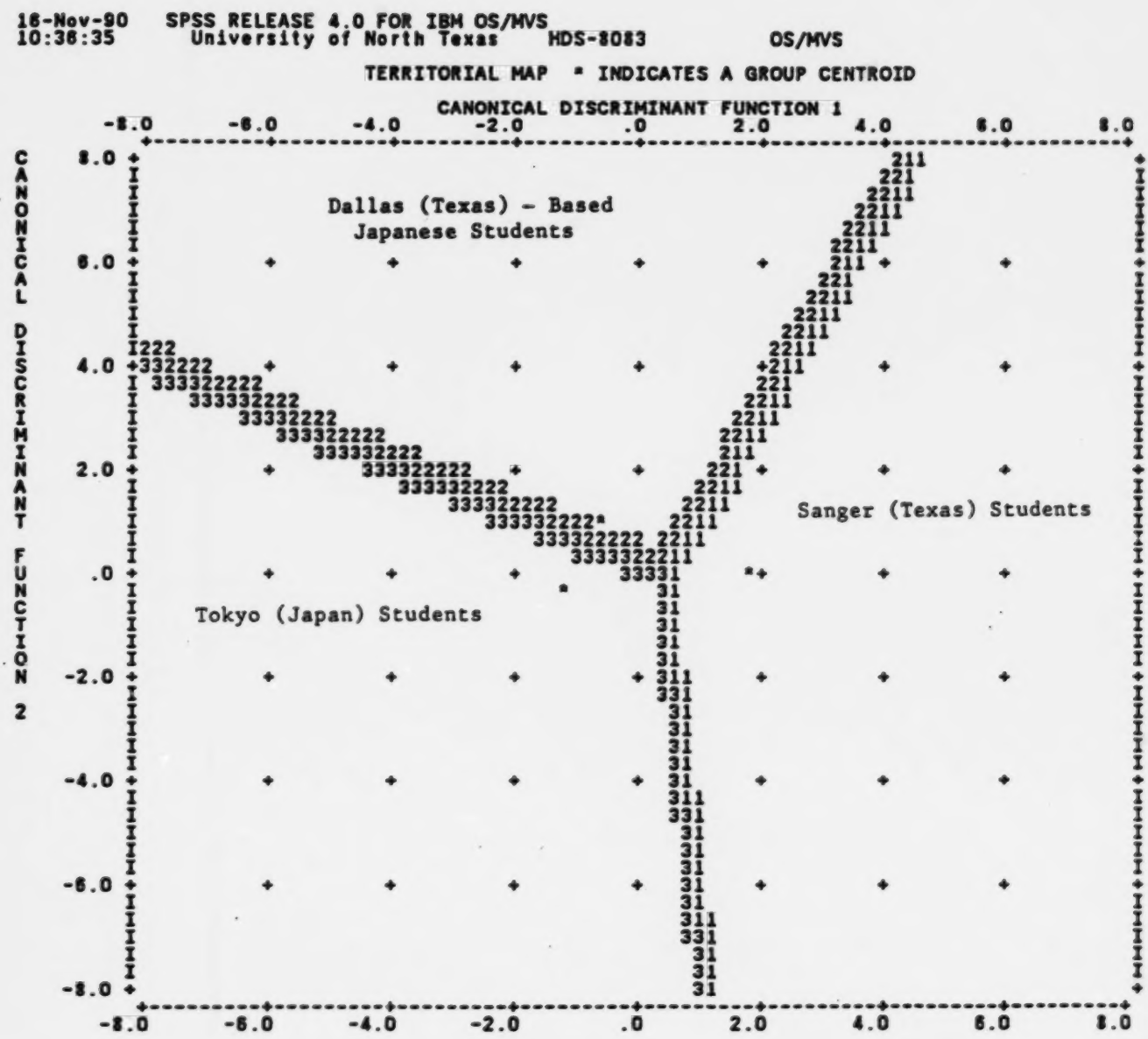


Figure 2

Discriminant Function Analysis

Territorial Map


16-Nov-90 SPSS RELEASE 4.0 FOR IBM OS/MVS
10:36:35 University of North Texas HDS-8083 OS/MVS
TERRITORIAL MAP * INDICATES A GROUP CENTROID
CANONICAL DISCRIMINANT FUNCTION 1
CANONICAL DISCRIMINANT FUNCTION 2
-8.0 -6.0 -4.0 -2.0 .0 2.0 4.0 6.0 8.0
Dallas (Texas) - Based Japanese Students
Sanger (Texas) Students
Tokyo (Japan) Students

APPENDIX
Item Stems for Young Children's Computer Inventory

1. I can learn many things when I use a computer.
2. I enjoy lessons on the computer.
3. I would work harder if I could use computers more often.
4. I think that computers are very easy to use.
5.* I would like to study with a teacher rather than using a computer.
6. I believe that it is very important for me to learn how to use a computer.
7. I will be able to get a good job if I learn how to use a computer.
8. I know that computers give me opportunities to learn many new things.
9. I believe that the more often teachers use computers, the more I will enjoy school.
10. I enjoy computer games very much.
11. I think about many ways to solve a difficult problem and I never give up.
12. I review my lessons every day.
13. I like to work out problems which I can use in my life every day.
14. If I do not understand my teacher, I ask him/her questions.
15. I enjoy working on a difficult problem.
16. I try to finish whatever I begin.
17. I study by myself without anyone forcing me to study.
18. I never forget to do my homework.
19. If I fail, I try to find out why I failed.
20. If I do not understand a problem, I will not stop working on it.
21. I do not like to see a child play alone, without a friend.
22. I feel sad when I see a child crying.
23. I feel happy when I see a friend smiling.
24. I feel sad when I see an animal hurt.
25.* Children who have no friends sometimes do not want a friend.
26.* I do not cry, even if I read a sad story or see a sad movie.
27.* I eat all of my cookies, even if another child wants some of my cookies.
28. I feel sad when I see old people alone.
29. I get angry when I see a friend who is treated badly.
30. I worry when I see a sad friend.
31. I invent new methods when one way does not work.
32. I find different kinds of materials when the ones I have do not work or are not enough.
33. I find new things to play with or to study, without any help.
34. I think about using other things to solve a problem.
35. I make a plan before I start to solve a problem.
36. I examine unknown issues to try to understand them.
37. I invent games and play them with friends.
38. I choose my own way without imitating methods of others.
39. I tend to consider various ways of thinking.
40. I tend to think about the future.

*Reversed items